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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,929	11/26/2003	Joseph P. Rynd	25226A	1182
22889	7590	11/30/2006		
OWENS CORNING 2790 COLUMBUS ROAD GRANVILLE, OH 43023				
			EXAMINER WOLLSCHLAGER, JEFFREY MICHAEL	
			ART UNIT	PAPER NUMBER

1732

DATE MAILED: 11/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/722,929	Applicant(s) RYND ET AL.	
	Examiner Jeff Wollschlager	Art Unit 1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 21 23, and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 21, 23 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's amendment to the claims filed September 8, 2006 has been entered. Claims 1-13, 21, and 24 are currently amended. Claim 22 is cancelled. The objection to claim 24 is withdrawn. The 35 U.S.C. 112, first paragraph rejection of claims 1-23 is withdrawn. Claims 1-16, 21, 23, and 24 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As recited below, claim 24 is indefinite as to its limiting effect. It is noted that in one possible interpretation of the claim there appears to be insufficient support in the specification for employment of a plurality of nano-particle materials as currently recited in the claim (U.S. PGPUB 2005/0112356; paragraphs [0012-0014] and Examples 1-6). There does not appear to be support in the specification to limit the claim to employ nano-particles of calcium carbonate, intercalated graphites, and expanded graphites and to employ an additional nano-

Art Unit: 1732

particle nucleating agent (U.S. PG PUB 2005/0112356; paragraphs [0012-0014] and Examples 1-6).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16, 21, 23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims recite, "at least one dimension less than 100". This is indefinite because there are no units of measure associated with the number 100. For the purposes of examination, the intended limitation is understood to require at least one dimension be less than 100 nanometers. This interpretation is supported by the specification (U.S. PG PUB 2005/0112356; paragraph [0011]). Additionally, claim 24 is indefinite because it is unclear whether the recited nano-particles and the nano-particle nucleating agents are different nano-materials or whether they are the same material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

Art Unit: 1732

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinshpun et al. (WO 2001/39954; published June 7, 2001) in view of Lee et al. (U.S. Patent 6,759,446; filed May 2, 2002) or Nitzsche (U.S. Patent 6,617,295; issued September 9, 2003).

Regarding claim 1, Grinshpun et al. teach a method of manufacturing a rigid foam (Figure 6; page 10, lines 5-30), comprising: incorporating nano-particle fillers, calcium carbonate, or clays into a polymer (page 19 line 38-page 20 line 5), incorporating a blowing agent into the melt under a first pressure and a first temperature (page 20, lines 7-30), extruding the polymer melt under a second pressure and temperature to allow the polymer melt to expand and foam, and cooling the foamed product (page 21, lines 9-30), to produce a foam, consisting primarily of blends of polystyrene (page 14, line 41-page 15 line 4; page 24), with a cell size ranging from 25 to 7000 micrometers (page 23, lines 11-15). Grinshpun does not explicitly teach that the nano-particles/nano-fillers employed are nano-clays, intercalated or expanded graphite, nor does Grinshpun disclose the particle size of the calcium carbonate. However, Lee et al. (hereinafter Lee) teach an analogous method of producing a rigid

Art Unit: 1732

foam product where nano-clays are utilized (col. 1, lines 41-59) with at least one dimension less than 100 nanometers. Additionally, Nitzsche teaches the use of calcium carbonate and nano-clays in the utilization of an analogous foaming resin (col. 3, line 64 – col. 4, line 7; col. 4, line 66-col. 5, line 9).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to take the method of Grinshpun for forming a rigid foam with calcium carbonate or clay additives and modifying it with the nano-clay additives taught by Lee or Nitzsche. One of ordinary skill would be motivated to do so, as taught by Lee, for the purpose of improving the physical properties of the foam (col. 1, line 41 – col. 2, line 22). Additional motivation is provided by Nitzsche who teaches that the particle size of nucleating agents impacts the cell structure (col. 2, lines 47-49) and that the foaming resin taught by his invention provides substantial cost savings (col. 2, lines 13-15). Therefore, the claimed invention as a whole is rendered *prima facie* obvious over the combined teaching of the prior art.

As to claims 2-4, Grinshpun teaches blends primarily consisting of polystyrene (page 14, line 41-page 15 line 4; page 24).

As to claims 5 and 6, Grinshpun teaches various blowing agents may be employed (page 18, lines 6-30).

As to claims 7, 8, and 16, Grinshpun teaches incorporating additives into the polymer melt such as nucleation agents, fillers and pigments (page 17, lines 12-20; page 19, line 38 - page 20, line 30).

As to claims 9-13, Lee et al. teach a method of manufacturing a rigid foam according to the method of claim 2, wherein the nano-particles are nano-Montmorillonite intercalated with polystyrene nano-clays used in the range of 0.5 – 5%, based on polymer weight (col. 1 lines 50 – 66 and col. 2 lines 43-50). Additionally, Nitzsche teaches the preferred use of montmorillonites for the foaming resin (col. 5, lines 6-9).

As to claims 14 and 15, Grinshpun teaches the foam has a density of 8 to 640 kg/m³ (page 13, lines 4-22; page 24, lines 25-37) and that the cell size is between 25 and 7000 micrometers (page 23, lines 11-15). Grinshpun is silent as to the other cell structure parameters. However, the method taught by Grinshpun in view of Lee or Nitzsche teaches the method of claim 2 as discussed in the 103(a) rejection above. As such, the product produced by the method, is rendered *prima facie* obvious as well.

Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grinshpun et al. (WO 2001/39954; published June 7, 2001) in view of Glicksman et al. (U.S. Patent 5,010,112; issued April 23, 1991).

Regarding claim 21, Grinshpun et al. teach a method of manufacturing a rigid foam (Figure 6; page 10, lines 5-30) comprising: incorporating a calcium carbonate filler into a polymer (page 17 lines 12-20) and at least one nucleating agent (page 19, line 38 – page 20, line 5), incorporating a blowing agent into the melt under a first pressure and a first temperature (page 20, lines 7-30), extruding the polymer melt under a second pressure and temperature to allow the polymer melt to expand and foam, and cooling the foamed product (page 21, lines 9-30) to produce a foam consisting primarily of

Art Unit: 1732

blends of polystyrene (page 14, line 41-page 15 line 4; page 24), with a cell size ranging from 25 to 7000 micrometers (page 23, lines 11-15). Grinshpun does not specify the shape of the calcium carbonate employed. However, Glicksman et al. teach an analogous method of producing rigid foam where they teach the calcium carbonate filler is an acicular nano-particle (col. 4, lines 12-21).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to employ the acicular shaped calcium carbonate filler as taught by Glicksman et al. as the calcium carbonate employed by Grinshpun for the purpose, as taught by Glicksman, of improving the insulating property of the foam (col. 1, lines 47-58). As such, the entire invention as a whole is rendered obvious over the combined teaching of the prior art.

As to claim 23, Grinshpun in view of Glicksman et al. produce a foam by the method of claim 21 as discussed in the 103(a) rejection above. As such the material produced will have the same claimed physical properties.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grinshpun et al. (WO 2001/39954; published June 7, 2001) in view of Morgenstern (U.S. Patent 6,589,646; issued July 8, 2003) or Nitzsche (U.S. Patent 6,617,295; issued September 9, 2003).

Regarding claim 24, Grinshpun et al. teach a method of manufacturing a rigid foam (Figure 6; page 10, lines 5-30) comprising: incorporating nanofillers and nucleating agents such as calcium carbonate graphites and clays into a polymer (page 17, lines

Art Unit: 1732

12-20, page 19, line 38 - page 20, line 5), incorporating a blowing agent into the melt under a first pressure and a first temperature (page 20, lines 7-30), extruding the polymer melt under a second pressure and temperature to allow the polymer melt to expand and foam, and cooling the foamed product (page 21, lines 9-30) to produce a foam with a cell size ranging from 25 to 7000 micrometers (page 23, lines 11-15).

Grinshpun does not explicitly teach what specific material the nano-particles/nano-fillers employed are, or does he teach the particle size of the conventional calcium carbonate employed.

However Morgenstern teaches an analogous method of employing calcium carbonate as a nucleating agent where he teaches the particle size of calcium carbonate is preferably in a range from 10 nanometers to 1000 nanometers (col. 2, lines 59-67). Additionally, Nitzsche teaches the use of calcium carbonate in the utilization of an analogous foaming resin (col. 3, line 64 – col. 4, line 7; col. 4, line 66-col. 5, line 9) and further teaches that the particle size of nucleating agents impacts the cell structure (col. 2, lines 47-49).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to employ nanofillers and nano-particles of calcium carbonate as a nucleating agent while practicing the method taught by Grinshpun for the purpose as taught by Nitzsche of controlling the cell structure in order to achieve desired product properties or as taught by Morgenstern to produce a foam well suited for employment as a composite layered sheet yielding reduced blistering of the produced material (col. 1, lines 11-15).

Response to Arguments

Applicant's arguments filed September 8, 2006 have been fully considered but they are not persuasive.

Applicant's arguments appear to be on the following grounds:

1. In the rejection of claims 1-16, neither Lee nor Nitzsche make up for the deficiencies of Grinshpun, such as, for example, the specific particle size of the nanoparticles. As such, there is no teaching or suggestion within the four corners of references to meet the amended claim limitations and therefore there can be no motivation to arrive at the claimed invention.

2. In the rejection of claims 21-23, Glicksman does not teach or suggest the particle size of the filler material as presented in the amended claims. As such, there is no teaching or suggestion within the four corners of references to meet the claim limitations and therefore there can be no motivation to arrive at the claimed invention.

3. In the rejection of claim 24, neither Nitzsche nor Morgenstern teach or suggest the particle size of the nanoparticles. As such, there is no teaching or suggestion within the four corners of references to meet the amended claim limitations and therefore there can be no motivation to arrive at the claimed invention.

Applicant's arguments are not persuasive for the following reasons:

1. Lee discloses nano-clays with a thickness of <1 nm (col. 1, lines 50-53; col. 2, lines 65-67). This meets the amended limitation of a nano-clay with a particle size in at least one dimension of less than 100 nm. As such, the references teach all the claim limitations.

2. Glicksman discloses flakes of filler material, such as calcium carbonate, with a major dimension of 1000 nanometers and that the flakes are in the shape of a "platelet" or are "needle-like". The examiner's interpretation is that a "platelet" or "needle" with a major dimension of 1000 nanometers suggests a material having at least one minor dimension of less than 100 nanometers. This interpretation is supported by the dimensions of the commercially available needle-like/acicular calcium carbonates and by the generally accepted meaning of the words "platelet" and "needle-like". As a conventional example, U.S. Patent 3,627,480 discloses a minor axis as low as 100 nanometers for needle-shaped calcium carbonate with a major axis of 10,000 – 100,000 nanometers, which is 10 – 100 times larger than the major axis disclosed by Glicksman.

3. Morgenstern discloses nanoparticles with a preferable particle size range of 10 to 1000 nanometers (col. 2, lines 58-67). This is not outside the claimed particle size range of less than 100 nanometers.

Conclusion

All claims are rejected.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 6,123,881 to Miller et al. teach a pertinent process for producing foam with a cell size in the range of 10 – 400 micron similar to the method taught by Grinsphun et al.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Friday 7:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

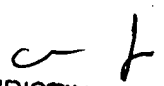
Art Unit: 1732

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JW

Jeff Wollschlager
Examiner
Art Unit 1732

November 16, 2006


CHRISTINA JOHNSON
SUPERVISORY PATENT EXAMINER
11/22/06